



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
OSB2000-0073

May 1, 2000

Mr. Lawrence C. Evans
Chief, Regulatory Branch
Corps of Engineers, Portland District
ATTN: Ms. Judy Linton
P.O. Box 2946
Portland, OR 97208-2946

Re: Endangered Species Act Section 7 Formal Consultation on Ross Island Sand & Gravel
Company's Removal/Fill Permit Renewal (Army Corps of Engineers Permit Application
ID No: 99-1500)

Dear Mr. Evans:

This letter represents the National Marine Fisheries Service's (NMFS) Biological/Conference Opinion (Opinion), pursuant to Section 7(a)(2) of the Endangered Species Act (ESA), that the effects of Ross Island Sand & Gravel Company's (RIS&G) Removal/Fill Permit Renewal, together with cumulative effects and the effects of the environmental baseline, are not likely to jeopardize the continued existence of certain listed, proposed and candidate fish species. This letter also authorizes incidental take associated with the subject activities.

Background

By letter to Rick Applegate, NMFS, dated December 7, 1999, the U.S. Army Corps of Engineers (COE) requested formal consultation for RIS&G's Removal/Fill Permit Renewal. Enclosed in the December 7, 1999 letter was a Biological Assessment (BA) prepared by CH2M Hill (1999a), the COE non-Federal representative for this project. Prior to the formal consultation request, numerous pre-application meetings occurred between NMFS, the COE, RIS&G, the U.S. Fish and Wildlife Service, the Oregon Department of Environmental Quality (DEQ), Oregon Department of Fish and Wildlife (ODFW), and other various state and local regulatory agencies.

Table 1 provides a list of the listed and proposed species and associated critical habitat covered in this consultation. References for biological information and historical population trends are also provided. Lower Columbia River/Southwest Washington coho salmon, a candidate species, was also considered in this consultation.

The project area is located at approximately river mile 15.0 of the Willamette River within the City of Portland, Multnomah County, Oregon. The area includes Ross, Hardtack, Toe, and East

Islands. The mainstem Willamette River bounds the area on the west, and Holgate Slough, a side channel of the river, bounds the area on the east. The north end of the area extends to just south of the Ross Island Bridge (also known as the Powell Bridge). The project site has been privately owned and operated as a commercial sand and gravel facility since 1926. An earthen dike was constructed between the southern ends of Ross and Hardtack Islands in 1926-1927 (USCOE 1974). The construction of this dike created the Ross Island lagoon. The lagoon is connected to Holgate Slough through a 500-foot-wide mouth that opens eastward. Ross and Hardtack Islands currently comprise about 177 acres, and the Ross Island lagoon currently comprises about 157 acres. RIS&G deeded Toe Island to the Nature Conservancy in 1979. A large portion of the lagoon currently has depths between 80 and 130 feet mean sea level (msl).

Proposed Action

The purpose of the proposed action is the renewal of RIS&G's existing permits authorizing aggregate removal and fill activities in the Ross Island area. The renewal is requested for a period of five years (May 1, 2000-April 30, 2005). The purpose of the aggregate removal activity is to remove materials for processing and commercial sale as sand, gravel, or crushed rock. The purpose of the filling activity is to reclaim land at Ross Island to specifications outlined in the RIS&G Conditional Use Permit issued by the City of Portland (approved in April 1981). As described in the BA (CH2M Hill 1999a), the proposed project also includes a number of other conservation and enhancement measures that RIS&G will implement to avoid, minimize, or compensate for any potential detrimental or adverse effects on species and habitat. In December 1999, RIS&G also announced that mining operations will cease during the five-year period, and that this permit would be the last sought for mining activities at this location.

The proposed project involves the removal of sands, gravel, and cobbles to -130 ordinary low water such as previously authorized by COE and Oregon Division of State Lands (DSL) permits. Over the next five years, a total of up to 4.5 million cubic yards (cy) of material will be removed from within approximately the northern half of the lagoon and uplands along the north shoreline of the lagoon at a rate of approximately 900,000 cy per year.

Aggregate removal will be accomplished using a barge-mounted clamshell dredge. Using this dredging method, the barge is positioned in specific locations using RIS&G's Global Positioning System and the clamshell bucket is lowered by crane to the bottom. The bucket is hoisted back to the surface and retrieved material is placed on a separate loading barge adjacent to the crane. The bucket is capable of retrieving about 10 cy of material (approximately the amount an average dump truck can hold).

Aggregate materials removed from the Ross Island lagoon and shoreline areas are loaded onto barges and taken to the unloading facility and processing plant located at the northwest end of Hardtack Island. All barge unloading and loading occurs in this area. Raw material is removed from the barges by another clamshell crane and carried to a high point of the crusher complex. The processing plant consists of six crushers, seven vibrator screens, and seven crushed material hoppers. RIS&G sorts 13 grades of aggregate at the Hardtack Island processing facility.

Finished aggregate is washed, and the wash water is discharged into a settling pond. The settling pond allows fall-out of by-product silt and sand material. Running the pond water through a cyclone further enhances removal of by-product silt and sand. Some water from the settling pond is used for DEQ-permitted, sprinkler irrigation of vegetated upland areas. The accumulated silts and sands are removed from the pond every one to two years and are placed in nearby upland fill areas.

Material processed at the Hardtack Island facility is loaded by conveyor onto barges for delivery to either of four commercial transfer points owned by RIS&G. These plants are located in the Portland area within about a 10-mile radius from Ross Island and include: (1) the Tait plant, located along the Willamette River just northeast of the Ross Island Bridge; (2) the Albina ready-mix plant located along the Willamette River just northeast of the Fremont Bridge (I-405); (3) the Albina asphalt batching plant located along the Willamette River just northeast of the Fremont Bridge (I-405); and (4) the Vanport plant, located along the Columbia River just southwest of the Interstate Bridge (I-5). To reach the plants, the barges travel from the lagoon mouth north along the Holgate Slough to the Willamette River.

Over the next five years, upland mining will occur in up to about seven acres from along the north shoreline of the lagoon. Upland material will be retrieved by taking material from along the shoreline in incremental strips of about 20 feet in width. Vegetation and topsoil along the upland margin will be removed and stockpiled where practicable to minimize potential introduction of suspended sediments to adjacent lagoon waters. RIS&G plans to conduct upland removal activity only during winter (December through February). RIS&G has committed to retaining the large wood (trees) from the upland area (that will be mined) for placement within the lagoon or around the island as fish habitat (pers. comm. Ken Carlson, CH2M Hill).

In upland areas, a leave strip of at least 80 feet wide will be maintained between the Willamette River and the lagoon, except where the existing leave strip is less than 80 feet wide. The exterior slope of the islands will remain unchanged. The interior, or lagoon-side, slope of the islands will be mined to a final slope no steeper than 1.75 horizontal to 1.0 vertical, from the top of bank to the toe of slope. Natural vegetation within the leave strip will be maintained for erosion control and aesthetics.

RIS&G is implementing several restrictions of its operations to protect fish and water quality. Specifically, aggregate removal and in-water filling within areas less than 40 feet deep will occur only during the periods of July through October and December through February 15 (an ODFW approved, modified in-water work period). This will avoid project-related effects during the primary periods of salmonid presence. Upland mining activities will occur only during December through February. This will minimize project-related effects on salmonids when present in the lagoon, and confine potential turbidity effects to times when turbidity is already naturally high in the lower Willamette River.

In addition, as described later in this document, a comprehensive turbidity/suspended sediment monitoring and management program will be implemented. This program will assess turbidity

conditions on each day that proposed activities occur, and conditions will be compared to turbidity thresholds established to protect water quality and salmonids. If thresholds are reached as a result of turbidity generated by RIS&G activities, RIS&G will implement various prescribed management actions agreed-upon by NMFS and DEQ, including suspension of operations if necessary.

RIS&G is also implementing other sediment and erosion control measures, as appropriate, and has committed to:

- Use sediment fences, silt curtains, leave strips or berms, or other measures sufficient to prevent offsite movement of soil and suspended particulates.
- Where practicable, avoid or minimize exposed soil areas during wet weather seasons or other runoff-producing events.
- Provide graveled construction accesses to prevent movement of material offsite via construction vehicles.
- Install and maintain sediment traps or catch basins, as necessary, to settle out solids prior to water entering waterways.
- Maintain an undisturbed natural area to provide a buffer between the river and the lagoon area. Existing vegetation will be maintained in the area and/or established as needed to stabilize soils and prevent erosion.
- Remove and stockpile where practicable, prior to aggregate mining in upland locations, large woody debris (LWD) and topsoil along the upland margin to minimize potential introduction of suspended sediments to adjacent lagoon waters. The stockpiled LWD and topsoil will then be used, as needed, for subsequent reclamation and restoration activities.

RIS&G is implementing runoff control measures, as appropriate, including:

- On-site runoff detention and retention;
- Settling pond maintenance to maintain efficiency;
- Removal of sediments from pond and placement in upland areas to avoid water quality effects; and
- Water conservation and recycling where feasible.

Over the next five years, the proposed project will involve in-water and upland placement of up to 4.5 million cy of clean fill materials, such as unused aggregate material and imported fill material from various sources. As described below, RIS&G will require that fill material be warranted to ensure against toxic or hazardous substances. During the five-year term of the permit, filling and reclamation will occur mainly in the southern half of the Ross Island lagoon and reclaimed upland area. The amount of upland area reclaimed will be equivalent to aggregate removal quantities within upland areas, averaged on an annual basis during the term of the permit. For proposed in-water fill, RIS&G plans to maintain an approximate balance between amount of lagoon material removed and fill material placed on a total basis over the entire five-year permit term.

At present, RIS&G is not accepting or placing fill material from any sources due to potential contamination concerns. RIS&G is collaborating with DEQ and others in an ongoing voluntary

remedial investigation of sediment contamination within the lagoon. The investigation will assess the potential contamination concerns and define needed actions. RIS&G plans to resume filling upon resolution of concerns related to potential contamination of certain previous fill sites, and definition and approval by DEQ of criteria required to ensure against toxic or hazardous substances in future fill material. RIS&G is anticipating that DEQ's definition and approval of criteria required to ensure against toxic or hazardous substances in future fill material will occur soon, so as to allow needed filling to continue throughout the proposed five-year permit period.

Materials used as upland or in-water fill at the Ross Island complex will be subject to a warrantee provided by the provider. Before RIS&G accepts fill material, the warrantee must provide information (including analytical test results) demonstrating that the material does not contain toxic or hazardous materials, waste, and/or substances as defined by relevant local, state or Federal regulations, and that the fill does not contain solid waste as defined by the state. For in-water fill material, the warrantee must further demonstrate that the acquisition and delivery of the material is approved under Section 404 of the Clean Water Act, as administered by the COE (including approval under the Endangered Species Act), that a Section 401 water quality certificate has been issued by the state, and that the material has been approved under state removal/fill requirements as administered by DSL. RIS&G will maintain a record of each fill event, including the provider's name, source of material, type of material, date of fill event, associated permit numbers for water-derived fill, and the quantity and location of fill placement. This information will be submitted to the COE and DSL prior to the proposed fill event and until the ongoing remedial investigation is completed.

Finally, RIS&G is implementing other hazardous materials control measures, as appropriate, including:

- Replacing petroleum-based lubricating oils with vegetable-based biodegradable oils wherever practical;
- Regular training of staff on emergency preparedness for storage and handling of on-site hazardous materials (such as, fuels);
- Maintaining equipment on RIS&G barges for immediate emergency spill response if needed;
- Properly storing and handling hazardous materials as per manufacturer's guidelines; and
- Continuing to rinse all equipment prior to in-water use.

Four methods of fill placement will be used: Mechanical clamshell bucket, Tremie hopper and tube, hydraulic submerged diffuser, and split-hull bottom dump barge. For a specific fill placement, the method of filling will be determined based on which method would most efficiently place and control dispersion of fill of a certain type and amount of fill. Fill placement will be conducted in a manner to avoid or minimize turbidity, and to provide for stabilized slopes to reduce potential erosion hazards.

As with previous permits, RIS&G proposes to conduct reclamation in accordance with the Material Removal and Reclamation Program (Reclamation Program) that is part of the City of Portland Conditional Use Permit (CU 106-79). This reclamation plan was submitted to the City

of Portland in 1979. The Reclamation Program requires that RIS&G reclaim mined upland and in-water areas so that, at completion, the uplands are restored to a width of about 400 feet and elevation of about 24 to 35 feet above msl, and the lagoon is refilled to an average depth of 20 feet below msl (-20 msl).

During the course of consultation with other agencies and RIS&G on the proposed project, it was generally concluded that the Reclamation Program should be reevaluated in the context of current scientific information about salmonid and other wildlife habitat needs. RIS&G has proposed to DSL a process to update the Reclamation Program and provide assurances of the program's implementation. RIS&G has proposed that a committee composed of key agencies (including NMFS) and RIS&G develop a revised reclamation plan. If and when a revised plan is agreed upon, it will replace the Reclamation Program. Otherwise, reclamation will continue on the islands and in the lagoon under the current Reclamation Program.

Biological Information and Critical Habitat

A list of all the listed and proposed species and their associated critical habitat information that are covered in this consultation is provided in Table 1. References for additional background on biological information and historical population trends are also provided.

Table 1. References for additional background on listing status, biological information, and critical habitat elements for the listed and proposed species addressed in this consultation.

Species	Listing Status		Critical Habitat Final Rule	Biological Information, Historical Population Trends
	Proposed Rule Proposed Rule	Final Rule		
Lower Columbia River Steelhead		March 19, 1998; 63 FR 13347	February 16, 2000; 65 FR 7764	Busby <i>et al.</i> 1995; Busby <i>et al.</i> 1996
Lower Columbia River Chinook Salmon		March 24, 1999; 64 FR 14308	February 16, 2000; 65 FR 7764	Myers <i>et al.</i> 1998; Healey 1991
Upper Willamette River Steelhead		March 25, 1999; 64 FR 14517	February 16, 2000; 65 FR 7764	Busby <i>et al.</i> 1995; Busby <i>et al.</i> 1996
Upper Willamette River Chinook Salmon		March 24, 1999; 64 FR 14308	February 16, 2000; 65 FR 7764	Myers <i>et al.</i> 1998; Healey 1991
Southwestern Washington/ Columbia River Coastal Cutthroat Trout ¹	April 5, 1999; 64 FR 16397		N/A	Johnson <i>et al.</i> 1999; Trotter 1989

¹ The Fish and Wildlife Service (FWS) and NMFS have, in the past, jointly managed coastal cutthroat trout under the ESA. Effective November 22, 1999, the FWS assumed all ESA regulatory jurisdiction over coastal cutthroat with one short-term exception in the Umpqua Basin (April 21, 2000, 78 FR 21376). Although cutthroat are under FWS' jurisdiction, NMFS included them in this Opinion since NMFS originally was covering this species when the discussions on this project and ESA consultations began.

The action area is defined by NMFS regulations (50 CFR Part 402) as “all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.” The action area includes designated critical habitat affected by the proposed action within the Willamette River in Portland at river mile 15. This area serves as a migratory corridor for both adult and juvenile life stages of all listed species under consideration in this Opinion. This area may also serve as a rearing area for juveniles. Essential features of the adult and juvenile migratory corridor for the species are: (1) Substrate, (2) water quality, (3) water quantity, (4) water temperature, (5) water velocity, (6) cover/shelter, (7) food (juvenile only), (8) riparian vegetation, (9) space, and (10) safe passage conditions (50 CFR Part 226). The essential features that this proposed action may affect as a result of potential turbidity and physical disturbance from aggregate removal and fill activities in the lagoon are water quality, cover/shelter, riparian vegetation, space, and safe passage conditions.

Evaluating Proposed Actions

The standards for determining jeopardy are set forth in Section 7(a)(2) of the ESA as defined by its implementing regulations (50 CFR 402). When the NMFS issues a conference or biological opinion, it uses the best scientific and commercial data available to separately determine whether a proposed Federal action is likely to: (1) jeopardize the continued existence of a proposed, listed, or candidate species, and/or (2) destroy or adversely modify a proposed or listed species' critical habitat. This analysis involves the following steps: (A) Define the biological requirements of the species; (B) evaluate the environmental baseline relative to the species' current status; (C) determine the effects of the proposed or continuing action on the species; (D) determine whether the species can be expected to survive with an adequate potential for recovery under the effects of the proposed or continuing action, the environmental baseline and any cumulative effects, and considering measures for survival and recovery specific to other life stages; and (E) identify reasonable and prudent alternatives to a proposed or continuing action that is likely to jeopardize the continued existence of the species.

Furthermore, NMFS evaluates whether the action, directly or indirectly, is likely to destroy or adversely modify the listed species' critical habitat. The NMFS must determine whether habitat modifications appreciably diminish the value of critical habitat for both survival and recovery of the listed species. The NMFS identifies those effects of the action that impair the function of any essential element of critical habitat. The NMFS then considers whether such impairment appreciably diminishes the habitat's value for the species' survival and recovery. If NMFS concludes that the action will adversely modify critical habitat it must identify any reasonable and prudent measures available.

For the proposed action, NMFS' jeopardy analysis considers direct or indirect mortality of fish attributable to the action. NMFS' critical habitat analysis considers the extent to which the proposed action impairs the function of essential elements necessary for adult and juvenile migration and rearing of the listed salmon under the existing environmental baseline.

A. Biological Requirements

The first step in the method the NMFS uses in applying the ESA standards of Section 7(a)(2) to Pacific salmonids is to define the species' biological requirements that are most relevant to each consultation. The relevant biological requirements are those necessary for the listed and proposed species to survive and recover to a naturally reproducing population level at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance their capacity to adapt to various environmental conditions, and allow them to become self-sustaining in the natural environment.

The NMFS finds that these biological requirements are best expressed in terms of environmental factors that define properly functioning freshwater aquatic habitat necessary for the survival and recovery of the listed species. Individual environmental factors include water quality, habitat access, physical habitat elements, river channel condition, and hydrology. These are measurable variables, with properly functioning values estimated using the best available information as those necessary for sufficient prespawning survival and distribution, spawning success, egg-to-smolt survival, smolt emigration survival and timing, and smolt condition to allow the long-term survival of the species. Properly functioning watersheds, where all of the individual factors operate together to provide healthy aquatic ecosystems, are necessary for the survival and recovery of these species.

For this consultation, the most relevant biological requirements are: 1) Improved habitat characteristics that function to support successful migration and rearing, and 2) unimpeded passage. The current status of the listed and proposed species, based upon their risk of extinction, has not significantly improved since the species was listed.

B. Environmental Baseline

The environmental baseline is an analysis of the effects of all past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem throughout the action area. For most activities, the action area covered by this Opinion is the Willamette River in the vicinity of Ross Island. For some interrelated activities (that is, barging and processing plants), the action area includes portions of the Willamette River downstream of Ross Island to about its confluence with the Columbia River to incorporate locations of barging and processing plants.

The biological requirements of the listed and proposed species are currently not being met under the environmental baseline. Their status is such that there must be a significant improvement in the environmental conditions they experience over those currently available under the environmental baseline. Any further degradation of these conditions would have a significant impact due to the amount of risk they presently face under the environmental baseline.

Analysis of Effects

A. Effects of Proposed Action

The lower Willamette River is primarily used by salmonids during their upstream migration as adults to upriver and tributary spawning areas, and downstream migration as juveniles to the ocean (Knutsen and Ward 1991, Ward and Nigro 1992, Ward et al. 1994). Juvenile outmigration of all species occurs during the spring, although a secondary peak of chinook outmigration occurs during the fall (BES 1999, PGE 1999, Beak 2000). Juvenile salmonid species such as spring chinook and coho salmon and up-river steelhead usually move downriver relatively quickly and in the main channel. Knutsen and Ward (1991) and Ward et al. (1994) report that juvenile salmonids migrate through the Portland area quickly, mostly in a matter of several hours to a few days. A more extended period of rearing by some juvenile salmonids in the lower Willamette River is possible. There have been speculations and some collection of subyearling fish in the lower Willamette River (BES 1999, Beak 2000).

In the lower Willamette River, nearshore shallow water areas (less than about 20 feet deep) are considered preferred habitat areas for juvenile salmonids, and are utilized predominantly as a migration corridor and for refuge and feeding. Knutsen and Ward (1991) and Ward et al. (1994) observed that outmigrating juvenile salmonids could be found anywhere spatially in the river in the lower Willamette River, but were typically found within 150 feet of the shore and most were collected within 18 feet of the water surface. Information from the Columbia River indicates that during migration, juvenile fall chinook salmon typically are found in shallow, nearshore habitats (Dawley et al. 1986). Steelhead juveniles are normally found mid-river during migration (Dawley et al. 1986).

Juvenile salmonids, particularly chinook and coho, often prefer and seek natural off channel habitat during their outmigration (such as, side channels, off channel ponds or sloughs, alcoves along the river margin, temporarily flooded riparian areas) (Dawley 1986, BES 1999). Juvenile salmonids are sensitive to rising and falling water levels, moving into off channel habitats as levels rise (such as during floods) and moving out as levels drop (Bayley 1999). By moving into off channel habitats, the juvenile salmonids are seeking both refuge (particularly from high water velocities and from predators) and sources of food. Bayley (1999) has observed increased growth rates of juvenile chinook while utilizing shallow backwater areas in the upper Willamette River. Fishman (1999) observed active feeding by juvenile chinook on zooplankton in Smith and Bybee Lakes during high flows in the adjacent lower Willamette River.

Use of the Ross Island lagoon by juvenile salmonids has been observed (Beak 1999, 2000), primarily by chinook of wild and hatchery origin, and hatchery coho. Juvenile salmonids were less abundant at lagoon sampling sites than at nearby sites outside the lagoon in Holgate Slough and the Willamette River. Juvenile salmonids in the lagoon were observed at depths equal to or shallower than 30 feet and mostly near shore. Abundance of juvenile salmonids decreased during the sampling period, and many of the fish displayed signs of smoltification, suggesting that these fish were actively migrating downstream through the river system (Beak 1999, 2000). Some age-0 chinook salmon juveniles were observed, which suggests that some summer and

winter rearing of these fish in the area could occur. However, Beak (2000) indicates that abundance of rearing chinook juveniles is very low except during peak migration periods.

The seasonal occurrence of upstream migration in the lower Willamette River varies by species so that adult migrants may be present throughout most of the year. The rate of upstream movement by adult migrants through the lower Willamette River in the Portland area is not well documented. Adult steelhead have been documented entering the mouth of the Clackamas River in darkened coloration indicating they have been in freshwater for some time (BES 1999). By contrast, Schreck et al. (1994) showed that adult chinook salmon covered distances in the lower Willamette River averaging from 6 km/day to 59+ km/day. No salmonid spawning habitat is known to exist in, or downstream, of Ross Island. No adult salmonids were observed using the Ross Island lagoon during recent fish studies (Beak 1999, 2000).

Turbidity and Fish Effects

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated Total Suspended Solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorous fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure (not just the TSS concentration). Willamette Valley salmonids have evolved in a system that periodically experiences short-term (days to weeks) or seasonal elevated TSS/turbidity events (winter storms and floods) and are adapted to periodically elevated TSS exposures.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore et al. 1980, Birtwell et al. 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay et al 1984, 1987, Sigler et al. 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, except when the fish need to traverse these streams along migration routes (Lloyd et al. 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1998). The presence of juvenile salmonids in the lagoon during their spring outmigration indicates that the lagoon is not avoided altogether due to turbidity. However, use of the lagoon by salmonids is much less than the adjacent river, suggesting that some level of avoidance may be occurring, although not necessarily related to turbidity. Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorous fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade-off (e.g., enhanced survival) to the cost of potential physical effects (e.g., reduced growth). Turbidity levels of about 23 NTU have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence and magnitude of physical or behavioral effects (Newcombe and

MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids appear to be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjorn and Reiser 1991). However, research indicates that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding et al. 1987, Lloyd 1987, Servizi and Martens 1991).

During consultation on the proposed action, NMFS worked extensively with DEQ and CH2M Hill (technical consultants for RIS&G) to evaluate turbidity effects on fish and develop measures to control turbidity and avoid effects. An extensive literature search was conducted to evaluate behavioral and physiological responses of salmonid fish species to turbidity and suspended solids. The literature search resulted in 125 data points from 38 scientific documents, linking fish effects with exposure times and turbidity or TSS concentrations. The data used in this evaluation provided complete information regarding the fish species studied, their life stages, the source of the suspended sediment/turbidity, the suspended sediment/turbidity levels, the exposure duration, and a quantifiable response from the exposure.

The responses were ranked based on level of effects, similar to the ranking used by Newcombe and Jensen (1996). The fish response data were also evaluated for both negative and positive responses; at low turbidity levels, the literature suggests that salmonids are attracted to turbid water to avoid predation while at high turbidity levels, salmonids can exhibit both avoidance behavior and physiological effects.

Literature data indicate that salmonid acclimation to turbidity/TSS reduces detrimental effects. Additionally, continuous turbidity monitoring (CH2M Hill 1999c, 2000) indicates that the river turbidity has a large influence on lagoon turbidity during and after storm events. Protective threshold values were developed by NMFS, DEQ, and CH2M Hill for periods when the river typically experiences periodic high levels of TSS and turbidity as a result of storm events (November – June) and when the river TSS and turbidity is typically low (July-October). The protective threshold levels are provided in Table 2.

Table 2: Turbidity Threshold Levels

Turbidity Level (NTU)	July – October	November – June
Long-term level (4-week average)	25	70
Action level (2-day average)	60	100
Stop work level (1-day average)	100	120

RIS&G proposes to implement, on a year-round basis, several baseline Best Management Practices (BMPs) to avoid or minimize turbidity from its operations (T. Melville, DEQ, and J. Rue, RIS&G, pers. comm.). RIS&G will monitor turbidity in the lagoon and Holgate Slough on each day when in-water operations are occurring, and monitor compliance with the long-term level on a running 4-week average basis. If it is determined that RIS&G activities cause an exceedance of the long-term average, then RIS&G will propose additional baseline BMPs and

implement the BMPs. If daily turbidity monitoring shows that the action level has been exceeded over a 2-day period, and it is further determined that RIS&G activities are the cause of the exceedance of the action level (e.g. lagoon levels are higher than river levels and there is not a turn-over occurring within the lagoon), then RIS&G will propose additional BMPs and a schedule for implementing the BMPs. If daily turbidity monitoring shows that the stop work level has been exceeded over a 24-hour period, and it is further determined that RIS&G activities are the cause of the exceedance of the stop work level, then RIS&G will suspend the activity that is causing the exceedance.

Measured turbidity levels in the lagoon at depths occupied by juvenile salmonids (that is, less than about 30 feet in depth) are typically 25 NTU or less, although peak measurements of 260 NTU at 40 feet and 127 NTU at 20 feet have been observed (Beak 1999, CH2M HILL 1999b). Therefore, turbidity levels in the lagoon often are less than, but may occasionally exceed levels reported to have potential physical and behavioral effects on salmonids. However, because use of the lagoon by salmonids occurs temporarily during their outmigration, any such physical and behavioral effects are expected to be temporary and short-term. In addition, adherence by RIS&G to the threshold levels as described above should provide protection against any detrimental effects to fish.

In-water and Riparian Habitat Effects

The Ross Island lagoon area contains primarily deep water (greater than 30 feet with a majority greater than 80 feet in depth) and a limited amount of shallow water habitat preferred by juvenile salmonids. Near the bank areas there are pieces and accumulations of large woody debris (LWD) and some snags left standing in the water nearshore. No other natural cover types have been identified in the lagoon. Typically, the banks within the lagoon are sand/silt, steep, and associated with sand/silt substrates.

The steep slopes found along most of the lagoon shoreline limit the quantity and extent of nearshore, shallow water habitat. The southern portion of the lagoon is the only area containing banks that are more gradually sloped, resembling a beach. The beach in this area is associated with both sand/silt substrate and gravel substrate. Fish monitoring data (Beak 1999, 2000) tends to verify that the preferred habitat by juvenile salmonids inside the lagoon is shallow water beach areas, 0 to 10 feet, with a gradual slope, some cover, and a substrate of sand/silt or gravel.

Aggregate removal and filling activities in the Ross Island lagoon may cause temporary and localized effects on physical habitat, such as by changing depth, substrates, and bank and riparian character. Aggregate removal activities, particularly in shallow, nearshore areas will disturb shallow water habitat depending on when and to what extent such areas are dredged. The immediate impact of aggregate removal and filling would include disruption of bottom habitat and loss of benthic organisms associated with the bottom materials that are removed from dredging or covered by filling.

Aggregate removal and fill activities are not expected to alter use of nearshore and shallow water habitat by juvenile salmonids when present. During those periods when salmonids are present

(that is, primarily April-June and November), aggregate removal and in-water filling would occur only in deeper areas of the lagoon (areas deeper than 40 feet). These deeper areas are generally not preferred for use by juvenile salmonids.

Over the next five years (the period of the permit renewal), aggregate removal will occur only in the northern portion of the lagoon. Most of the northern portion of the lagoon is represented by deep, open water with depths greater than 40 feet. Juvenile salmonids are not typically found in such deepwater areas. Therefore, aggregate removal in the northern lagoon to a depth of -130 msl should not significantly alter the current status of fish habitat.

Aside from in-water habitats, upland areas can provide important refuge and feeding habitat for juvenile salmonids during flood inundation (Bayley 1999). Over half of the upland areas proposed for mining are in the 100-year floodplain elevation or higher. Short-term loss (RIS&G will reclaim equal amounts of upland areas for that mining within the permit period) of this habitat could result in reduced opportunities for fish to interact with the floodplain should a large flood event occur during the permit period.

Over the next five years, filling and reclamation will occur mainly in the southern portion of the Ross Island lagoon, and will involve the placement of up to 4.5 million cy of clean fill materials, such as unused aggregate material and imported fill material from various sources. Some reclamation has already occurred in the southern portion of the lagoon and uplands areas. The Conditional Use Permit requires that the lagoon be backfilled to an average bottom elevation of -20 feet msl at the end of the restoration activities. While approximately one-fourth (39 acres) of the total lagoon area of 157 acres has had some fill placement, areas within the fill area generally have not yet been brought up to an average -20 feet msl. Use of the turbidity threshold levels (Table 2) and associated actions accompanied by timing restrictions on when filling can occur within areas less than 40 feet deep (only during the periods of July through October and December through February 15) will minimize impacts to salmonids.

For proposed in-water fill, RIS&G plans to maintain an approximate balance between amount of lagoon material removed and fill material placed on a total basis over the entire five-year permit term. Although RIS&G plans an approximate balance in quantities of material removed and filled, this balance should result in a net increase in shallower lagoon area. Removal will occur from either existing upland or already deepened lagoon areas, whereas filling will be focused on expanding the area in the southern portion of the lagoon restored to a depth of -20 msl. As a result, this filling has the potential to enhance several acres of suitable shallow water habitat for juvenile salmonids, although the amount cannot be quantified exactly because of uncertainty over specifically where and how much removal and fill will be authorized by DEQ over the next five years.

Beyond the five-year permit term, NMFS foresees the potential for substantial enhancement of suitable shallow water habitat for juvenile salmonids as lagoon reclamation continues. Such restoration will be significantly facilitated by RIS&G's decision to cease mining activities within

the five-year permit term, and by reevaluation of the current reclamation plan to incorporate recent scientific information of fish habitat needs.

Potential Contamination Effects

Sediments from the lower Willamette River have been previously placed in the lagoon that are known or suspected to contain contaminants, such as metals, tributyltin (TBT), polycyclic aromatic hydrocarbons (PAHs), and polychlorinated biphenyls (PCBs) (Hart Crowser 1999). NMFS believes that risk is low of potential contaminant exposure and effects on salmonids in the Ross Island lagoon. Aggregate removal and fill operations are planned to avoid any disturbance and resuspension of these sediments, and future fill materials will be assessed and warranted to ensure against toxic or hazardous substances.

Furthermore, DEQ, RIS&G, and others are conducting a remedial investigation of sediment contamination within the lagoon. The investigation will be conducted over the next 1-2 years. The investigation will provide information to characterize potential contamination, determine if contaminants have been released from material after fill disposal, determine if contaminants are likely to be released to the environment, and identify likely transport routes for these contaminants if released. RIS&G has committed to use the results of the investigation to guide future actions as needed to appropriately manage these fill materials.

Potential Effects from Other Activities

Other disturbance related to barging, aggregate removal, and aggregate processing occurring in and near the lagoon could potentially impact salmonids in the lagoon, Holgate Slough, and downstream in the Willamette River. During operation, the barges produce noise and turbulence that could directly disturb salmonids. The barges could also provide shade that could attract juvenile salmonids but also attract predators such as northern pikeminnow (*Ptychocheilus oregonensis*), and introduced predators such as largemouth bass (*Micropterus salmoides*), smallmouth bass (*Micropterus dolomieu*), black crappie (*Pomoxis nigromaculatus*) white crappie (*P. annularis*) and, potentially, walleye (*Stizostedion vitreum*). However, such effects, if any, are expected to be minor and temporary because the barge movements are transient and short-term in duration, fish would likely actively avoid such disturbances, and would not be expected to effectively use the shade and cover the barges provide.

The RIS&G operations require illumination during night operations. Salmonids can be attracted to dull light at night, and can be distressed if, and where, lights brightly illuminate the water. Most juvenile salmon predators are sight feeders. Although the Ross Island facilities and equipment are lighted at night, lighting in much of the lagoon remains subdued or dark. Therefore, when present, juvenile salmonids would be expected to have ample access to dark areas.

The activities at RIS&G facilities produce noise. Noise from activities in the water produce sound waves that would be expected to invoke an avoidance behavior by most fish in close

vicinity. Therefore, when present, salmonids are expected to actively avoid such disturbances. Also, most of these activities occur in areas of the lagoon that are less suitable and therefore not well utilized by juvenile salmonids. Therefore, effects, if any, to juvenile salmonids are expected to be negligible.

Activities in the lagoon and at RIS&G facilities require use of some in-water structures, primarily pilings for boat, barge, and dredge mooring. These structures provide cover for juvenile salmonids while in the area, but can also create potential habitat for predators. Ward (1992) found that stomachs of northern pikeminnow in developed areas of Portland Harbor contained 30% more salmonids than those in undeveloped areas, although undeveloped areas contained more northern pikeminnow. Most of the in-water structures of the RIS&G facilities are associated with the Hardtack Island facilities in the southeastern portion of the lagoon area. Although these structures provide some cover, it is not expected that these areas are well utilized by salmonids, because salmonids are likely to avoid the higher activity level in that area and preferentially use other more suitable habitat areas in the lagoon. In fact, this area was the least utilized area of the sampling sites inside or outside of the lagoon (Beak 1999, 2000).

There is a potential for accidental spill or release of contaminants (such as, petroleum products) from boats and dredges into the lagoon or adjacent river. The release of contaminants into the lagoon is an unlikely event. However, RIS&G is sensitive to this issue and has instituted spill prevention and emergency spill response procedures. These procedures are designed to alleviate or minimize potential environmental impacts. In addition, wherever practicable, RIS&G uses biodegradable vegetable oils in place of traditional petroleum-based oils. Because of the unlikely nature of a release and the procedures RIS&G has in place, impacts to juvenile salmonids are expected to be non-existent, or otherwise negligible.

B. Critical Habitat

As described in previous sections of this Opinion, RIS&G's Removal/Fill Permit Renewal may affect essential features of the proposed critical habitat of LCR steelhead, LCR chinook salmon, UWR steelhead, and UWR chinook salmon. Aggregate removal and fill may cause turbidity and contaminant effects on fish health and habitat use. Aggregate removal and fill may also affect the quantity and suitability of shallow water habitat. However, various measures proposed by RIS&G should minimize any impacts resulting from the project, including:

1. Cease aggregate mining within the next five-years;
2. Restrict operations at certain times and locations;
3. Monitor operations and implement BMPs as needed to adhere to turbidity thresholds; and
4. Implement additional measures to control erosion, runoff, and hazardous materials.

Furthermore, lagoon and upland reclamation should improve habitat conditions and more than offset any alteration to critical habitat from proposed operations.

Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as "those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." For the purposes of this analysis, the action area encompasses the area around the proposed project (the Willamette River in the vicinity of Ross Island including Holgate Slough).

Although RIS&G will cease aggregate mining during the five-year term of the proposed action, filling operations will continue thereafter to reclaim lagoon and uplands. These future filling operations will require a separate COE fill permit and ESA Section 7 consultation process.

As filling activities continue in the future, effects on juvenile salmonids such as previously described are expected to continue. However, as restoration progresses over the life of the project, filling should enhance the amount of suitable shallow water habitat for juvenile salmonids since the existing lagoon contains little such habitat at present. In fact, the final restoration of the lagoon has the potential to provide a significant and substantial enhancement of preferred habitat for juvenile salmonids in the lower Willamette River.

Conclusion

NMFS has determined that, based on the available information, RIS&G's Removal/Fill Permit Renewal is not likely to jeopardize the continued existence of LCR steelhead, LCR chinook salmon, UWR steelhead, UWR chinook salmon, SW/CR sea-run cutthroat trout, or LCR/SW coho salmon, nor will it result in the destruction or adverse modification of designated critical habitat of the LCR steelhead, LCR chinook salmon, UWR steelhead, or UWR chinook salmon.

The NMFS reached this conclusion because the proposed action includes measures to: 1) Cease aggregate mining within the next five-years, which will eliminate all mining-related effects and conserve habitat; 2) restrict operations in uplands and shallow in-water areas to the Oregon Department of Fish and Wildlife's in-water work period, a time when the least amount of listed fish will be present in the project area; 3) monitor operations and implement BMPs as needed to adhere to turbidity thresholds that will protect salmonids; 4) implement additional measures to control erosion, runoff, and introduction of hazardous materials so as to avoid fish and water quality impacts; and 5) continue to implement lagoon and upland reclamation that should improve habitat conditions to the benefit of critical habitat and listed species.

Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. Conservation recommendations are discretionary measures suggested to minimize or avoid adverse effects of a proposed action on listed species, to minimize or avoid adverse modification of critical habitat, or to develop additional information. NMFS believes

the following conservation recommendations are consistent with these obligations, and therefore should be implemented by the Army Corps of Engineers:

1. The Army Corps of Engineers should require or work with Ross Island Sand and Gravel to re-evaluate the reclamation plan originally developed in the 1970s to determine if modifications are necessary to reflect new scientific knowledge gained since that date. Modifications should be made to improve habitat conditions for salmonids above that already proposed in the original 1979 reclamation plan.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects, or those that benefit listed species or their habitat, NMFS requests notification of the implementation of any conservation recommendations.

Incidental Take Statement

Sections 4(d) and 9 of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. Harass is defined as actions that create the likelihood of injuring listed species to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. Incidental take is take of listed animal species that results from, but is not the purpose of, the Federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement (ITS) specifies the impact of any incidental taking of endangered or threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts, and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures. An ITS does not apply to candidate or proposed species. While effects on LCR/SW coho salmon and SW/CR sea-run cutthroat trout were considered in this Opinion, the reasonable and prudent measures and terms and conditions set forth in this ITS do not apply to LCR/SW coho salmon and SW/CR sea-run cutthroat trout. Should either of these species become listed in the future, this ITS would become effective for these species upon adoption of this conference opinion as a biological opinion.

The measures described below are non-discretionary. They must be implemented by the action agency so that they become binding conditions necessary in order for the exemption in Section 7(o)(2) to apply. The COE has a continuing duty to regulate the activity covered in this incidental take statement. If the administrative unit: (1) fails to adhere to the terms and

conditions of the incidental take statement; and/or (2) fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse.

Amount or Extent of the Take

Notwithstanding the NMFS' conclusion that the subject proposed project is not expected to jeopardize the continued existence of LCR steelhead, LCR chinook salmon, UWR steelhead, UWR chinook salmon, there may be short-term impacts and NMFS anticipates that there could more than a negligible likelihood of incidental take of these species from some of the actions. The subject action, however, as described in this Opinion, is expected to result in a low level of incidental take of listed and proposed species in the proposed action area. Effects of the action such as these are largely unquantifiable, but are not expected to be measurable as long-term effects on the species' habitat or population levels. Therefore, even though the NMFS expects an incidental take to occur as a result of the action covered by this Opinion, the best scientific and commercial data available are not sufficient to enable NMFS to estimate a specific amount of incidental take to the listed and proposed species themselves. In instances such as these, the NMFS designates the expected level of take as "unquantifiable." Based on the information in the BA, the NMFS anticipates that an unquantifiable amount of incidental take could occur as a result of the action covered by this Opinion.

Reasonable and Prudent Measures

The NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize the likelihood of incidental take of the species covered by this Opinion.

1. The COE shall make a condition of the permit or otherwise require that RIS&G implement all conservation and enhancement measures as described in the BA to minimize the level of incidental take from suspended sediments, contaminants, habitat loss, disturbance, etc.
2. The COE shall make a condition of the permit or otherwise require that RIS&G cease aggregate mining by the end of the five-year permit term to limit the temporal duration of mining activities that may result in incidental take.
3. The COE shall make a condition of the permit or otherwise require that RIS&G monitor turbidity and implement management actions so as to adhere to turbidity thresholds as approved by DEQ and NMFS. This will minimize the level of associated incidental take.
4. The COE shall make a condition of the permit or otherwise require that RIS&G complete 1 to 1 reclamation of impacted areas during the life of the permit to minimize the habitat loss and consequent effects.
5. The COE shall make a condition of the permit or otherwise require that RIS&G conduct monitoring of fish species within the lagoon to ensure conclusions derived in this Opinion are based on accurate information on fish utilization of the lagoon.

6. The COE shall make a condition of the permit or otherwise require that RIS&G make any changes to operations as determined necessary by DEQ to protect salmonids by the remedial investigation of contaminants in the lagoon.
7. The COE shall make a condition of the permit or otherwise require that RIS&G provide an annual report to NMFS as required in the state DSL permit to ensure that activities occur as described in the BA and this Opinion.

Terms and Conditions

To minimize the likelihood of incidental take of listed salmonid species which may result from proposed future action, the COE shall implement the following terms and conditions. The proposed action covered by this Opinion must also comply with the terms and conditions of all required state, Federal, and local permits.

1. RIS&G will implement all conservation and enhancement measures as described in the BA. For example, large wood (trees) that will be removed from the 7 acres of upland area to be mined will be retained and used as fish habitat.
2. RIS&G will cease aggregate mining by the end of the five-year permit term.
3. RIS&G will monitor turbidity and implement management actions so as to adhere to turbidity thresholds as approved by DEQ and NMFS. The turbidity monitoring program and implementation of management actions shall follow the specific protocols as described by DEQ in their certification documentation (with attachments) for the proposed action as required under Section 401 of the Clean Water Act.
4. Except as described in this term and condition, RIS&G will complete 1 to 1 reclamation of areas impacted during the life of the permit. This will include replacement of upland areas with revegetation of native trees and other native species to recreate riparian habitat which will be removed during the mining process. Upland areas will be reclaimed within the 5 year life of the permit. Expectations for reclamation of the in-water impacted area are the same, but there are uncertainties associated with this activity (e.g. results and requirements of the on-going remedial investigation) and, therefore, in-water filling may be delayed somewhat (in other words, it may go beyond the 5 year permit). RIS&G will conduct reclamation of in-water areas that are mined during the permit period according to specifications outlined in the RIS&G Conditional Use Permit issued by the City of Portland and any amendments or revisions approved by NMFS which are developed during the upcoming reclamation planning process to be completed by July 1, 2002 (described earlier in this Opinion). In-water reclamation will also adhere to any further requirements as deemed necessary by DEQ (through the remedial investigation) and DEQ's definition and approval of criteria to ensure against toxic or hazardous substances in fill material used for reclamation.
5. Within the first year following the issuance of the permit, RIS&G will conduct monitoring of

salmonid presence and use within the lagoon. Monitoring will be conducted during the summer and winter to augment data previously collected during spring and fall 1999 by Beak (2000). Monitoring will include evaluating fish presence in the lagoon at depths greater than 20 feet. Specific depths and water temperature will be noted where fish are present.

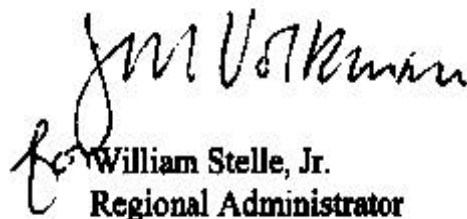
6. RIS&G will make any changes to operations as determined necessary by DEQ to protect salmonids by the remedial investigation of contaminants in the lagoon.
7. RIS&G will provide NMFS with the annual report required by the state DSL permit. Specifically, this will include: 1) A lagoon-wide bathymetric survey, that shows the location of all removal and fill activities; 2) a survey that shows the location of all upland filling activities; 3) a drawing showing the locations of in-water and upland removal activities derived from a daily log of GPS readings; 4) an inventory of all fill materials with provider name, source of material, type of material, quantity, method of placement, location of placement, date of fill event, associated permit numbers and reference of any ESA consultations for dredge material fill, and DEQ approvals for in-water fill; 5) a bathymetric survey showing the slope of the berm; 6) a drawing showing the locations of the "annual planting areas;" 7) photos from established upland photo monitoring points; 8) vegetation monitoring report that includes percent survival of planted species and percent cover of exotic species for each "annual planting area;" 9) turbidity monitoring data as per DEQ's water quality certification conditions; 10) report from on-going DEQ investigations; and 11) any bathymetric surveys conducted within the reporting period.

Reinitiation of Consultation

Reinitiation of consultation is required if: (1) The amount or extent of taking specified in the incidental take statement, above, is exceeded; (2) the action is modified in a way that causes an effect on the listed species that was not previously considered in the BA and this Opinion; (3) new information or project monitoring reveals effects of the action that may affect listed species in a way not previously considered; or (4) a new species is listed or critical habitat is designated that may be affected by the action (50 CFR § 402.16).

If you have any questions, please contact Michelle Day of my staff in the Oregon State Branch Office at (503) 231-6938.

Sincerely,


William Stelle, Jr.
Regional Administrator

cc: Kemper McMaster, FWS



References

Section 7(a)(2) of the ESA requires biological opinions to be based on "the best scientific and commercial data available." This section identifies the sources of data, information and references used in developing this Biological and Conference Opinion in addition to that submitted by the COE.

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